EIS001927

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From: Kevin Kamps
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Kevin Kamps

Date: February 28, 2000

Re: Comments on the Department of Energy's "Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada"

I submit these comments on behalf of Nuclear Information and Resource Service, a twenty-two year old, non-profit nuclear power and radioactive waste watchdog organization with thousands of members across the United States. Please consider them as additional to comments I presented at public hearings in Washington, D.C.; Las Vegas, NV; Salt Lake City, UT; and Cleveland, OH.

Overview

1 This DEIS is deficient under the National Environmental Policy Act and should be withdrawn, re-written, and re-submitted to the public with a full public comment period of at least 180 days. The reasons for this will be explained in the context of the following subject areas:

- **YUCCA MOUNTAIN WILL FAIL TO ISOLATE WASTE**
- **NATIONAL TRANSPORTATION OF IRRADIATED NUCLEAR FUEL**
- **RADIOACTIVITY'S DANGER TO HUMAN HEALTH AND THE ENVIRONMENT**
- **PUBLIC PARTICIPATION**

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- ENVIRONMENTAL JUSTICE
- SOCIAL AND ECONOMIC IMPACTS
- NO ACTION ALTERNATIVE
- SEISMIC ACTIVITY/GROUNDWATER CONTAMINATION
- LACK OF REPOSITORY DESIGN

Thank you for taking my comments into consideration. I look forward to your responses. Please contact me if you have any questions.

YUCCA MOUNTAIN WILL FAIL TO ISOLATE WASTE

2... DOE's own data shows that the Yucca Mountain site will fail to contain nuclear waste – radioactive gases will be released and radioactive waste will be washed into the ground water a short time after the first containers fail.

Containers do fail – about 70 dry storage casks are in use at reactors, and there have already been numerous failures and defects in just the first decade of use – not in the many thousands of years that the DEIS so confidently predicts the Yucca Mountain emplacement casks will reliably contain the waste. Repository casks will be made of different material, but the manufacturing will be subject to the same problems, and the casks will be licensed by the same all-too-imperfect Nuclear Regulatory Commission. There will be more than 10 thousand repository casks, and so likely hundreds of early cask failures. The failures with dry storage casks thus far have included faulty welds in Ventilated Storage Cask-24's at Palisades and Arkansas One nuclear power plants, resulting in loss of the inert helium environment and thus yet unknown amounts of deterioration to the fuel rods inside, which could lead to future fuel handling problems. A TN-40 cask at Surry nuclear plant also leaked helium, as well as developed cracks in its outer concrete shield, with increased potential for radiation escape. Dry storage casks at Point Beach, Palisades, and Trojan nuclear plants have suffered inadvertent chemical reactions between zinc inner anti-corrosion liners and acidic spent fuel pool water, generating hydrogen gas which led to an explosion that dislodged a three ton cask lid. Vectra NuHoms casks have suffered failure of Quality Assurance/Quality Control of the concrete aggregate, resulting in
...2 casks with too-thin walls at Davis-Besse nuclear plant. Such repeated inadvertent chemical reactions, premature aging, degradation, and deterioration in irradiated nuclear fuel storage casks – with young casks less than a decade old -- seriously challenges DOE's very optimistic assumptions about Yucca Mountain emplacement cask performance out to thousands of years into the future. The DEIS must address potential and inevitable cask failure within the repository.

3... In the meantime, the Yucca Mountain site violates a disqualifying condition for nuclear waste repositories – which requires that water move very slowly in the ground. DOE's own data shows that water travels very quickly through the rock at Yucca Mountain. Rather than disqualify the Yucca Mountain site from further consideration for the national repository as its own Site Selection Guidelines call for, DOE has repeatedly changed the rules of the game. Over

...3 200 local, state, national and international environmental / public interest organizations petitioned the DOE to disqualify the site under existing repository Site Suitability Guidelines, based on the demonstrated fast flow of young rainwater (less than 50 years old) deep down into Yucca Mountain to repository depth (the finding of high levels of Cl-36, the significance of which is obscured in this DEIS). DOE denied the petition to disqualify, not because they could prove the 200 groups were wrong, but because DOE wanted to study the site more in order to try to prove us wrong. DOE is in the process of attempting to change the Site Selection Guidelines, even while they are taking public comments on this DEIS that should be based on them. Since the Yucca Mountain site is not fit to isolate nuclear waste, DOE has come to rely on engineered barriers for containment. This contradicts the legislative mandate for the program of geologic isolation. If DOE is going to rely on engineered structures, the whole process must be started over to examine appropriate siting and design for engineered isolation. Instead of holding public hearings and taking public comment on Yucca Mountain, DOE should be holding public meetings on how to start over on a high-level nuclear waste program.

NATIONAL TRANSPORTATION OF IRRADIATED NUCLEAR FUEL

4 The DEIS is woefully inadequate at addressing the national transportation of irradiated nuclear fuel and high-level nuclear waste to the proposed repository at Yucca Mountain. Given that DOE admits that non-accident transports will affect residents within half a mile of routes, and that transport accidents could affect residents up to 50 miles from routes, this unprecedented nuclear waste shipping campaign will impact the lives of 50 million Americans in 43 States for decades. Transportation is of the utmost importance to the Yucca Mountain Project, and DOE's downplaying of it is a violation of the public's trust and also of the spirit if not also the letter of NEPA.

5 Despite the immense risk of this proposed undertaking, nowhere in the DEIS can a concerned citizen find the exact routes these deadly wastes will travel. The best one can find are maps showing the Interstate highway system and the rail system, and their proximity to atomic waste sites at reactors and DOE weapons facilities. One must then guess which routes would be used to get the waste to Yucca Mountain. One could never guess how much waste would travel along whichever route – how many truck or train shipments – because no such numbers are listed in the DEIS. Along with these major omissions is the lack of any examination of baseline conditions along those countless routes all over the country.

6 As mentioned below under **Public Participation**, DOE's extremely late release of transport route maps is inexcusable. Even these maps are still very vague: they have only been published on DOE's Yucca Mountain Project website, and certainly not everyone has ready access to the internet; they are hard to read (the highway route numbers are blurry); they are difficult to print because they involve so much memory; they do not show an overview of the entire nation; and they certainly do not show how many shipments would travel along a certain route, nor at what frequency.

7... The DOE must publish clear, truthful maps of the high-level waste/irradiated nuclear fuel transport routes to the proposed Yucca Mountain repository. The EIS must rigorously examine the risks involved in these shipments, and it must specify the exact mode of transportation – by train, truck, or barge. Site specific risks and potential impacts must be identified, to schools, hospitals, colleges, population centers, urban areas, agricultural lands, water and food storage, other vital resources, and natural areas along the routes. Increased risks of accidents due to extremes of weather or terrain must be analyzed, as well as the history of problems on these

...7 specific routes. In short, DOE should redo the entire national transport section of the EIS, and do it justice this time. DOE's failure to adequately assess transport impacts constitutes grounds for the withdrawal of the DEIS, and its re-issuance along with a new 180 day public comment period. Literally tens of millions of Americans have been kept in the dark by DOE – DOE concealed that fact that they live on irradiated fuel/high-level radioactive waste transport routes. Why did DOE do this?

8 The DEIS conclusions of no significant environmental impact from transport accidents with atomic waste casks are based on the 1987 Modal Study performed by Lawrence Livermore Labs for the Nuclear Regulatory Commission. NRC has now contracted with Sandia Labs to redo this outdated and incomplete study, but the final results won't be in till 2003 – two years after the scheduled final decision on whether to develop the Yucca Mountain repository. This is an egregious case of putting the cart before the horse – how can DOE be so confident that cask transport accidents present no significant risk when there is so little current data?

9 One way that DOE was able to find "no significant impact" in its early analyses of a severe shipping accident was by averaging the health damage across the whole US population. This is not only unacceptable, it is scandalous. This DEIS must be free of such twists on the truth.

10 The DEIS also fails to address the emergency response preparations that will be needed from coast to coast. Most local emergency responders in this country are volunteer departments, woefully lacking in both the training and equipment needed to deal with a radiological accident. Last October's criticality accident in Japan showed how important emergency preparedness is – responders were themselves seriously contaminated while attempting to rescue the injured workers. How many hospitals in this country have isolation rooms for radioactively-contaminated accident victims? Nuclear waste shipments will travel through countless communities across our nation, and DOE has not identified the grave impacts that could result from an accident. Public officials and emergency responders as well as concerned citizens have

11 the right to this information, and DOE must address it in this EIS. HOW WILL 30 YEARS OF NUCLEAR WASTE SHIPMENTS THROUGH COMMUNITIES IMPACT PEOPLES' LIVES?

RADIOACTIVITY'S DANGER TO HUMAN HEALTH AND THE ENVIRONMENT

12... One would be hard pressed to find in the DEIS many citations that refer to the dangers of irradiated fuel rods and high-level nuclear waste. Where is it described in there that just a few minutes exposure to fuel rods that have cooled down for years is still enough to cause a lethal exposure? Where is it mentioned that a lethal exposure to fuel rods just coming out of a reactor core after three years irradiation could occur in less than a minute? Where are the particular hazards of different radioactive poisons – alpha particles, beta particles, gamma rays, neutrons – described in simple enough terms that ordinary citizens can understand?

When I was in Las Vegas for the public hearing on January 10th, I visited the Yucca Mountain Project information center. I spent a few hours reading all the information displays in the whole place. There too I was hard pressed to find ANY information on radioactivity's harmfulness to human health. Only in one place was it mentioned that radiation can cause "changes" in human tissue. Only in one place was it mentioned that high-level wastes and "spent" fuel remains radioactive for a long time. The information center made high level wastes seem so safe, most visitors who have no more information must be left wondering what all the fuss is about?

...12 This DEIS retains that same "conspiracy of silence" about the health dangers of radioactivity that I encountered in the Yucca Mountain Project information center. But really, it's healthier for all of us to openly discuss that 800 pound gorilla sitting in the middle of the room.

13 As mentioned above, Yucca Mountain will leak radioactive contaminants into the ground water over time. Persons living downstream will ingest this contaminated water – they will drink it. They will water their crops with it. They will feed those crops to their cows, who will concentrate the radioactivity in their milk. The subsistence farmers will ingest the radioactivity by eating their crops, or drinking that milk. Watering crops with radioactively contaminated water will deposit radioactivity on the soil. This will "shine" radiation directly onto the people. Contaminated soil will blow up into the air as dust particles, which the people will inhale; they can also inhale radioactive gases escaping directly from within Yucca Mountain. These kinds of exposures describe exactly what is happening in the Chernobyl region right now – fission products entering people's bodies through the food chain.

Through all of these pathways and more, residents living downstream of the repository will take in radiation from Yucca Mountain. This will begin not long after the casks begin to fail. It will continue for thousands of years into the future. Peak doses will be orders of magnitude above levels that anyone would call acceptable. Establishing the repository at Yucca Mountain will condemn future generations to very harmful doses of radioactivity.

14 The DEIS only addresses latent cancer fatalities. What about the many other harms that radiation causes? Birth defects, genetic damage, non-fatal cancers, immune system depression, visual impairment, mental retardation, spina bifida – these maladies and many others have been associated with exposure to ionizing radiation. Why are such impacts not talked about in this DEIS? Because he/she would be the most vulnerable human, the fetus in the womb of a woman subsistence farmer should be defined as the maximally exposed individual downstream from Yucca Mountain.

15 Not only folks living downstream from Yucca Mountain would be exposed. So would folks living along the transport routes. What if a pregnant woman got stuck in a traffic jam on the Indiana toll road or on the south side of Chicago right next to a light weight truck cask? At 10 mrem/hour, stuck in a three hour Chicago jam, she would receive 30 mrem dose. That's not good for her fetus. What kind of psychological trauma would this mother-to-be suffer, seeing the radiation warning symbol next to her, having no real way to get away from it, fearing that it could be harming her unborn child?

What if the person driving the truck was a pregnant woman? If she drove a cask all the way across the country – how much of a dose would her fetus receive? Are there regulations against such a thing? If so, I didn't see them in the DEIS.

What about elderly folks living in a retirement home right on the roadside in Nevada, with countless heavy haul trucks going past on a daily basis. Their immune system is already challenged by their age. What will the continual gamma doses they receive to their vulnerable health? These are but a few real life examples of exposures that the DEIS seems to ignore. But similar examples could occur all over the country. Why doesn't the DEIS address such possible exposures?

16... The DEIS does address certain impacts on other living beings, such as wildlife – although far from adequately. However, one impact conspicuous by its absence is the affect of radioactivity from a Yucca Mountain repository on non-human life forms. Perhaps the human embryo is not the most vulnerable living being to radiation's harmful effects – perhaps the embryo of another animal species is. These kinds of radiation impacts go unaddressed in the

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...16 DEIS. What ecological affect would radiation have on the gene pool of threatened or endangered species such as the desert tortoise that live close to Yucca Mountain? In addition, what affect will the emplaced waste's high thermal heat have on species such as the desert tortoise, that lay their eggs in the ground, and on plant species that inhabit the surface of the desert land above and near to Yucca Mountain? These are environmental impacts that need to be addressed in an environmental impact statement.

PUBLIC PARTICIPATION

17... The DOE's outreach to solicit public comments on this DEIS leaves much to be desired. It was apparent at all of the four public hearings that I personally attended that DOE did a minimum to notify the public of the hearings and to encourage public participation. In Salt Lake City, Utah, several members of the public testified that a single ad in the newspaper two days before the hearing was the only public notice DOE made. In addition, the ad was small and vague. It did not communicate to the public that well over 90% of the irradiated nuclear fuel and high-level radioactive waste bound for the proposed repository at Yucca Mountain would pass through Salt Lake City and Utah – up to tens of thousands of shipments, a major impact on their community. In other words, the public in Salt Lake City was given almost no notice, and very little information as to why this DEIS hearing was important to their lives. As a result, few members of the public at large attended the hearing. The concerned citizens who did attend were mainly activists who follow this issue closely anyway, and who had been notified by other activists from other parts of the country, on short notice. Thus, word of mouth had to compensate for DOE's lack of effort in informing the public.

This same lack of adequate public notice was repeated by DOE at the other hearings I attended. The Las Vegas hearing had a very impressive public turn out, thanks mostly to the extraordinary efforts of local grassroots activists to spread the word. The Cleveland hearing also had a good public turn out, again thanks to the hard work of a small core of concerned citizens who took it upon themselves to promote the DOE's event. Otherwise, these hearings too might have suffered low turn outs, due to DOE's lack of effort at promotion. Of course, these concerned citizens did this on a volunteer basis, with no resources and no compensation. They outperformed DOE, which has paid staff and financial resources supposedly dedicated to promoting these public hearings.

Especially ironic was the relatively small public turn out at the Washington, D.C. hearing. DOE might erroneously attribute this to public apathy or disinterest, but a more accurate explanation was the lack of DOE vigor in promoting and publicizing the event. This, in the very location where the DOE Office of Civilian Radioactive Waste Management is headquartered.

At the Salt Lake City hearing, angered citizens asked the DOE officials present what promotions they had done. A DOE official mentioned a policy of running two paid advertisements, the first one weeks and then the second one days in advance of the event. Evidently, the ad weeks ahead must not have run, for no one in the room had seen it. The same official mentioned over 100 press releases sent out to the media. 100 press releases sent out to Utah? Pressed further, the official admitted that no, the 100 press releases were released only once, at the beginning of the public comment period, and were diffused all across the nation. Members of the Salt Lake City press corps who cover nuclear issues had not received the press release, which means that their newspapers had not received the press release. The same official then encouraged the citizens in attendance to spread the word, by word of mouth, to their friends and neighbors. A little late for that hearing, given that it was already underway. And just a little

...17 discouraging, in that DOE has the legal duty, as well as the taxpayer funding, to do the promotions.

This poor performance by DOE at seeking public participation leads to a number of questions. How many press releases were sent out? To where? When? What about the number of public hearings that were later added to the list – were press releases sent out announcing these additional hearings? How many? To where? When? How can DOE expect that a mere 100 press releases sent out in the beginning of a public comment period would suffice to promote these public hearings and the public comment period across the entire nation? Especially when DOE did not adequately communicate to citizens across the country that their communities are located on transportation routes for irradiated fuel and high-level nuclear waste?

18 In addition to the lack of promotion is the fact that, of the original 16 public hearings, 11 were held in Nevada; 3 more were held in the Western U.S. (Boise, Denver, and Salt Lake City); and only 2 were held in the rest of the country (Atlanta and Washington, D.C.). Left out of the public hearing process were dozens of major population centers and entire regions of the country which face the prospect of thousands of high-level atomic waste trains and trucks. Despite concerted citizen requests from such major transport hubs for these shipments as Chicago and northern Indiana, DOE OCRWM would not budge. For months, OCRWM refused such hearings, claiming they lacked the resources and had already scheduled enough public hearings. Certainly not in countless communities impacted by large numbers of shipments, though. It was as if DOE were trying to hide the truth about the shipment campaign to come from affected communities. It actually took the intervention of Members of Congress to wrest hearings from a reluctant DOE in Lincoln, Cleveland, and Chicago (St. Louis was added early on thanks to concerted citizen pressure). Even then, concerned citizens had to scramble in Lincoln, Cleveland and Chicago, for they had only three weeks (or less) to prepare for their hearing – no small task when considering the DEIS's, 1000+ pages, technical complexity, and general indecipherability. The DEIS is very difficult to read, making it virtually incomprehensible to all but the most ardent of concerned citizens. The confusing nature of the document itself – its interminable length, labyrinth of cross references, lack of plain language and lack of clear explanation – served as a roadblock to public participation in and of itself.

OCRWM also claimed that additional hearings were not needed, because anyone anywhere could simply send in their comments. But that is only if they know about the opportunity for public comment. For most people, the first they learned of the opportunity for public comment – the first time they got their hands on a copy of the DEIS – was at the public hearing near them. Whole regions of the country would have been left in the dark if concerned citizens hadn't taken initiative and demanded hearings in their region.

19 Only under pressure from Members of Congress did DOE publish its maps of projected irradiated nuclear fuel/high-level nuclear waste shipment routes, but not until January 21 -- *after* 17 hearings had already taken place, and only days before the remaining hearings. How was the public supposed to comment on these very significant but well hidden maps? How are members of the public supposed to learn that they live on high-level nuclear waste shipment routes, let alone participate in the public comment process, when DOE hides the maps until just two weeks before the end of the original 180 day public comment period?

20... All of this adds up to an apparent effort on DOE's part to discourage widespread public involvement in or even knowledge of this DEIS public comment period, especially in regards to the national transportation campaign that a Yucca Mountain repository would entail. This is a violation of the spirit if not the letter of the National Environmental Policy Act, and does not

...20 bode well for building trust or confidence in the public for DOE's Yucca Mountain Project and its associated, unprecedented transport campaign.

21 For all of these reasons, DOE OCRWM should either withdraw its DEIS, or extend the public comment period significantly – for another 90 or even 180 days – as well as hold hearings in communities across the nation along affected transport routes.

ENVIRONMENTAL JUSTICE

22 Using a groundless piece of circular logic, this DEIS holds that because the Proposed Action poses no impact anyway, it thus cannot impact low income communities or people of color. As shown above, this finding of no impact is flawed, as is this weak attempt to claim that principles of environmental justice are not being violated.

Who is most likely to live along the railroad tracks and the highway? In a place like Chicago, it would be people of color and the poor. Sometimes train cars sit on the tracks for up to 48 hours before moving on. If that car happens to hold an irradiated nuclear fuel cask, then the family sleeping in the house right next to the switch yard could receive a significant dose of gamma radiation. In certain sections of south Chicago, where thousands of high-level waste transports are targeted to go through, many residents are exclusively Spanish speaking. The same is probably true along transportation routes in Colorado, New Mexico, Arizona, and southern California. Has the DEIS been translated into Spanish? Why not? Why are these significantly impacted communities being excluded from the public comment process just because they don't speak English?

23 Whose land is being targeted for high-level nuclear waste dumps? At this time, Western Shoshone Indian land in Nevada, and Skull Valley Goshutes Indian land in Utah. Attempts to dump high-level wastes at the Mescalero Apache reservation in New Mexico were defeated just a few years ago. There seems to be a clear pattern of targeting Native American lands for high-level nuclear waste dumping.

Violations of environmental justice against Native Americans don't stop with potential health damage. There's also cultural damage. Yucca Mountain is sacred land to the Western Shoshone and a number of other tribes. Development of the repository would amount to an extreme case of desecration against their sacred land. In fact, a gathering has been called for early April, 2000 at Yucca Mountain, a spiritual gathering where traditional Natives Americans such as Western Shoshone spiritual elder Corbin Harney will gather to discuss the DOE's plans

24 to dump nuclear wastes at Yucca Mountain. These traditional Native Americans have requested that DOE extend its comment deadline so that their message from that gathering can be included in the preparation of the Final Environmental Impact Statement. I hope that you will honor their humble request.

25 In response to President Clinton's Environmental Justice Order in 1994, DOE committed to an Environmental Justice Strategy in 1995. Five short years later, in this crucial test of its commitment to Environmental Justice, DOE is failing to protect our nation's most vulnerable communities, in violation of its own stated policies.

26 The Environmental Justice Executive Order 12898 requires DOE to "ensure that public documents relating to human health or the environment are concise, understandable, and readily accessible to the public." This DEIS has failed miserably to fulfill this directive.

SOCIAL AND ECONOMIC IMPACTS

27 Loss of property value along radioactive waste transport routes all across the United States is a huge issue that this DEIS ignores. It's ignored at DOE's own peril, for property owners could very well attempt to sue DOE for compensation for decreased property values.

28 Another economic impact not assessed is the cost of escorting waste shipments through States. The State of Illinois has committed to escorting every single shipment of high-level waste from border to border as it passes through. Given tens of thousands of shipments, the bill for this could run into the hundreds of millions if not billions of dollars easily. Who's to pay for it – the Illinois taxpayers? If Illinois requires escorts, why don't other States?

NO ACTION ALTERNATIVE

29 The No Action Alternatives presented in the DEIS are unrealistic, even preposterous. They seem designed to serve as a scare tactic, to make readers fear that if the wastes are not shipped to Yucca Mountain, they will leak all their contents into the Great Lakes, the rivers, and the coastlines where U.S. nuclear reactors are located. Society would never allow such a thing to happen. In fact, the Nuclear Waste Policy Act, as Amended, instructs DOE on what the No Action Alternative to Yucca Mountain is. If and when DOE determines that the Yucca Mountain site is unsuitable for the nation's repository, the DOE is supposed to return to Congress within six months for further direction. Perhaps then our nation can enter into the national dialogue that is so long overdue, to realistically try to address the nuclear waste dilemma with something better than quick fixes that fly in the face of sound science, play on raw politics, and throw good money after bad – the two decade old story of the Yucca Mountain Project.

SEISMIC ACTIVITY/GROUNDWATER CONTAMINATION

30 Why will Yucca Mountain fail to isolate nuclear waste? The answer is very simple. Yucca Mountain is as seismically active as San Francisco Bay. Indeed, Nevada is the third most earthquake prone State in the Union after Alaska and California. Riddled with dozens of fault lines, there's a whole lot of shaking going on at Yucca Mountain. Well over 600 earthquakes with a magnitude greater than 2.5 on the Richter scale have struck within 50 miles of the proposed repository site in the past 25 years alone. A 5.6 jolt, centered less than 10 short miles from Yucca Mountain, did serious damage to the DOE field office in June, 1992. In the past few years, the tremors seem to have increased in frequency. Just last fall, a quake derailed a train on a proposed repository transport route.

What does this mean for the proposed Yucca Mountain repository. Researcher Jerry Szymanski has concluded that the level of the water table has risen dramatically – perhaps over 100 meters higher than the current level – in the past. Other researchers, Davies and Archambeau, predict that a small earthquake at Yucca Mountain could raise the water table 150 meters, while a severe earthquake could raise the level nearly 250 meters – high enough the flood the repository. Such a catastrophe would lead to early breaching of waste casks and a massive release of radioactivity into the groundwater below. The DEIS admits that such a scenario is possible, but leaves it at that, not addressing the potential environmental impacts.

All this shaking has fractured the relatively soft rock (volcanic tuff) that forms this low snaking ridge. The entire mass of Yucca Mountain is a sieve with tiny fractures that allow water and gas to flow in and out, which is not exactly ideal for isolating deadly nuclear wastes.

31... The Western Shoshone Nation, which by the way has the rightful claim to Yucca Mountain by the 1863 Treaty of Ruby Valley which the U.S. government signed, has a different name for the site. It translates as "Serpent Swimming Westward." Indeed, global positioning

...31 satellite studies, published in *Science* magazine in 1998, have confirmed that the crust at Yucca Mountain is expanding westward, and at a rate an order of magnitude greater than previously believed. (Another recent finding, published in *Scientific American* in the last month or two, is that plutonium is much more soluble in water than previously believed, which may account for its unexplained mobility in the soil of the Nevada Test Site. This finding challenges the very concept of long-term geologic isolation of plutonium. This issue should be addressed in the EIS, for it holds great import for the ability of Yucca Mountain to contain plutonium.)

This observation is consistent with the presence of a magma pocket beneath Yucca Mountain. Indeed, standing atop Yucca Mountain, one can see a line of lava cones extending westward. The youngest cone is closest to Yucca Mountain. This too is striking evidence of the presence of a magma pocket beneath Yucca Mountain – like the formation of the Hawaiian Islands, these lava cones are like the squirts from a gigantic subterranean pastry bag.

Perhaps the biggest danger from the presence of lava beneath Yucca Mountain is the possibility that it could drive hot groundwater up into the repository, flooding the waste casks. Indeed, recent analyses of gas trapped in crystals that are abundant inside Yucca Mountain shows that these crystals were formed by HOT water welling up into the mountain from below. The question scientists are currently examining is how recently this took place. Hot water flooding the repository could quickly deteriorate the casks, and could even lead to a steam or chemical explosion or nuclear criticality event. In any case, the radiation release would be catastrophic.

If only we could listen to the ancient wisdom of the Western Shoshone, who knew long ago that Yucca Mountain was swimming westward, we might be able to avert a major environmental catastrophe of burying nuclear waste where it will almost certainly leak into the biosphere. It is our generation's job to prevent such a catastrophe, not cause one!

LACK OF A REPOSITORY DESIGN

32 It's hard to believe, but DOE has proceeded with this DEIS even though the exact repository design remains to be determined. How environmental impacts can be assessed without that basis covered is hard to understand.

It's akin to DOE proceeding full speed ahead with the EIS while claiming that the exact routes of high-level radioactive waste transportation to Yucca Mountain has yet to be determined. Or DOE assuming that repository casks will remain intact for thousands and thousands of years. Or DOE assuming that the groundwater will dilute contamination to safe levels, even though DOE doesn't even know for sure the direction of groundwater flow. How then can the DOE claim there will be no significant impacts to public health or the environment from this Proposed Action? How can it know? What are it's findings based on?

33 There are some other very important questions that the DEIS needs to answer. How is it that the State of Nevada estimates the Yucca Mountain Project costing $54 billion, while DOE 34 projects $28 billion? Why does the DEIS not mention the fairly significant fact that Yucca Mountain cannot contain all the waste that the nuclear industry plans to generate? Where will the 35 next repository be located, then? Why is civil disobedience not adequately discussed, when in Germany 20,000 protestors blocked a handful of casks, requiring the deployment of 30,000 36 police at the cost of $100 million. How about the "No Action Alternative" of phasing out nuclear power?